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U–Pb laser ablation ICP-MS zircon dating across the Ediacaran–Cambrian transition of the Montagne Noire, southern France



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ABSTRACT

U–Pb laser ablation inductively coupled plasma mass spectrometry was used for dating zircon grains extracted from four sedimentary and volcano sedimentary rocks of the Montagne Noire encompassing the presumed Ediacaran–Cambrian boundary interval. Magmatic zircon from two samples from the basal and middle parts of the Rivernous Formation (a rhyolitic tuff) were deposited at 542.5 ± 1 Ma and 537.1 ± 2.5 Ma, bracketing the 541 Ma age presently admitted as being at the Ediacaran–Cambrian boundary. In addition, a piece of sandstone from the underlying Rivernous Formation containing mostly euhedral zircon grains, suggesting proximal magmatic sources, yields Neoproterozoic dates ranging from 574 Ma to 1 Ga, and subsidiary older dates from 1.25 to 2.75 Ga. Another piece of sandstone from the overlying Marcory Formation yielded mostly rounded zircon grains probably issued from more remote areas, with a large spectrum dominated by Neoproterozoic dates as well as older ages up to 3.2 Ga. A comparison of both kinds of sandstone suggests a significant change in provenance, changing from a restricted source area during the Ediacaran to a much larger source domain during the Cambrian Epoch 2 that recorded contributions from different cratons of Gondwana.

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